

REMARKS

In view of the above amendments and the following remarks, favorable reconsideration and allowance of the above application is respectfully sought.

The claims now presented for consideration are claims 1-5, 7-23 and 25-45, with claims 1, 4, 23, 29, 35-38, and 40 being independent. Claims 1, 4, and 23 have been amended to improve their form and to more clearly recite the present invention. Applicant submits that no new matter has been added.

Initially, Applicants note with appreciation that claims 29-33, 34/33, and 35-45 have been allowed. Applicants also note that claims 3, 7-9, 11, 12, 17-21, 27, 28, and 34/7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form. These claims have not been so amended inasmuch as Applicants assert that the rejected base claims from which they depend are allowable over the cited art.

Claims 1, 4, and 23 are rejected under 35 U.S.C. § 112 for failing to comply with the enablement requirement and as being indefinite for failing to point out and distinctly claim the subject matter of the invention. In particular, the Office Action rejects the claims because of their use of the term “angle of field.” Applicants traverse these rejections. Nevertheless, Applicants submit that the current amendments to claims 1, 4, and 23 obviate these rejections. In particular, these claims have been amended to further clarify “angle of field.” Applicants believe that support for the amendments can be found at least in Figure 1B and in the specification, for example, on page 5, lines 5-14, and on page 22, lines 1-3.

Claims 1 and 2 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,088,134 to Schmidt. Claims 1, 2, 4, 5, 10, 13, 15, 16, and 22 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,769,718 to Imamura. These rejections are respectfully traversed.

Claim 14 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Imamura in view of Schmidt. Claims 23, 25, and 26 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Imamura. These rejections are respectfully traversed.

Independent claim 1 recites an image reading system, including an image optical element including a plurality of off-axial reflecting surfaces differing in the direction of incidence and the direction of emergence of a reference axis ray from one another and having curvatures, and an angle of field, wherein the angle of field is an angle defined between a principle ray of an off-axis light beam and a principle ray of an on-axis light beam.

Similarly , independent claims 4 and 23 recite image reading apparatuses having, *inter alia*, (i) an imaging optical element having a plurality of off-axial reflecting surfaces differing the direction of incidence and the direction of emergence of a reference axis ray from one another and having curvatures, and (ii) an angle of field, wherein the angle of field is an angle defined between a principle ray of on off-axis light beam and a principle ray of an on-axis light beam.

According to the claimed arrangements, a system/apparatus is provided having a predetermined angle of field, for example, to image image information on a line sensor elongated in the main scanning direction. As discussed in the specification, if an optical path length is made too short, so as to make the imaging optical system/apparatus

small, the angle of field becomes large and it is difficult to obtain high performance of both on-axis and off-axis light beams. See, e.g., p. 5, ll. 5-20. It is thus desirable in the art to minimize the size of the system/apparatus, while increasing the length of the optical path. For example, multiple fold mirrors, and lenses therebetween, can be provided. The claimed inventions provide unique arrangements for minimizing the size of the system/apparatus.

Applicants submit that the cited art does not teach or suggest many features of the claimed invention.

Applicants assert that Schmidt discloses a telecentric system and that the principal rays are in parallel with an optical axis, as described at column 8, lines 20-24. Applicants believe that a telecentric lens is a lens in which the aperture stop is located at the front focus, resulting in the chief rays being parallel to the optical axis in image space, i.e. the exit pupil is at infinity. (See, e.g., <http://www.photonics.com/dictionary/lookup/lookup/XQ/ASP/url.lookup/entrynum.5266/letter.t/pu./QX/lookup.htm>). Moreover, with regard to Figure 6b, Applicant asserts that the solid fold imager 62 is the same element as converging mirror means 32 in Figure 7. In such an embodiment, light beams emerging from an object point 34 on an object plane 37 are imaged on an imaging point 36 of an image plane 35. The light beam path in these figures is thus defined by connecting two points. Schmidt fails to teach or suggest at least an angle of field, as recited in independent claim 1.

Imamura relates to an image processing apparatus equipped with an original document illuminating lamp, a reflector arranged in association with the lamp, and a photosensitive member adapted to receive light from an original document. According to

Applicants' understanding, in Figure 2 of Imamura, the reflector 3 is not an imaging optical element, but is an element for guiding light from lamp 1 to an original picture 5.

Accordingly, reflected light is not imaged on the original picture 5, and it is impossible to define the angle of field between the lamp 1 and the original picture 5. Moreover, Imamura is concerned with reducing reflection performance due to wavelength by providing a color-compensating coating layer 6 on the reflector 3 (See, Column 8, lines 13-38). For the foregoing reasons, Applicants submit that Imamura fails to teach or suggest at least an angle of field, as recited in independent claims 1, 4, and 23. Moreover, Imamura does nothing to cure the deficiencies discussed above with respect to Schmidt.

Accordingly, Applicants submit that Schmidt and Imamura, whether taken alone or in combination, fail to teach or suggest features of independent claims 1, 4, and 23. As such, Applicants submit that each of independent claims 1, 4, and 23 is distinguishable over the applied art of record.

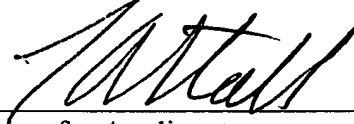
Claims 2, 3, 5, 7-22, and 25-28 depend either directly or indirectly from one of claims 1, 4, and 23 and are therefore patentable over the art of record for reasons noted with respect to the respective base claims, and for defining other patentable features of the invention. Favorable and independent consideration of the dependent claims are respectfully sought.

This Amendment was not presented earlier, inasmuch as it was earnestly believed that the claims heretofore on file were in condition for allowance. It is believed that the Examiner's familiarity with the present application will allow full consideration hereof without the expenditure of undue time and effort.

Applicants respectfully submit that this application is now in condition for allowance. Favorable reconsideration and early passage to issue of the above application are respectfully sought.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,



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